



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

AF
3C
#15
1-2204

Appl. No. : 09/732,391
Applicant : Spurgeon, James D.
Filed : December 7, 2000
TC/A.U. : 2178
Examiner : DOUG HUTTON

Title : BELLOWS TYPE MECHANICAL SEAL

Docket No. : 32040US1
Customer No. : 000116



Confirmation No. 9867

RECEIVED

JAN 16 2004

Technology Center 2100

Mail Stop Appeal Brief- Patents
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

REQUEST FOR REINSTATEMENT OF APPEAL

Sir:

This communication is filed in response to the Office action dated October 9, 2003 (Paper No. 14). The three month period for responding to the Office action was set to expire on January 9, 2004.

Applicant hereby requests that the appeal proceeding initiated by the "Notice of Appeal" mailed May 14, 2003 be reinstated forthwith. A supplemental appeal brief, as prescribed by MPEP § 1208.02, is enclosed herewith.

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop Appeal Brief- Patents, Commissioner for Patents, P.O. Box 1450, Alexandria VA 22313-1450 on the date indicated below.

Aaron A. Fishman

Name of Attorney for Applicant(s)

Signature of Attorney

January 9, 2004

Date



If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 16-0820, our Order No. 32040US1.



Respectfully submitted,

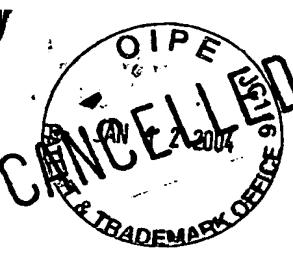
PEARNE & GORDON LLP

By: 
Aaron A. Fishman, Reg. No. 44682

1801 East 9th Street
Suite 1200
Cleveland, Ohio 44114-3108
(216) 579-1700

Date: January 9, 2004

RECEIVED
JAN 16 2004
Technology Center 2100



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Appl. No. : 09/732,391
Applicant : Spurgeon, James D.
Filed : December 7, 2000
TC/A.U. : 2178
Examiner : DOUG HUTTON

Confirmation No.9867



Title : BELLOWS TYPE MECHANICAL SEAL

Docket No. : 32040US1
Customer No. : 000116

RECEIVED

JAN 16 2004

Mail Stop Appeal Brief- Patents
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Technology Center 2100

APPELLANT'S SUPPLEMENTAL BRIEF

Sir:

This supplemental brief is filed in support of the Request for Reinstatement of Appeal mailed concurrently with the supplemental appeal brief.

Pursuant to 37 CFR § 1.192, this brief is filed in triplicate. As prosecution of the application was reopened prior to a decision on the merits by the Board of Patent Appeals and Interferences, the fees paid for the notice of appeal and appeal brief should be applied to the instant request for reinstatement and supplemental brief. If there are any additional fees resulting from this communication, please charge same to our Deposit Account No. 16-0820, our Order No. 32040US1.

(1) REAL PARTY IN INTEREST

Infinity Manufacturing, Inc., a corporation of Georgia, is the owner of this application by assignment from the applicant.

(2) RELATED APPEALS AND INTERFERENCES

This supplemental appeal brief relates to the appeal brief filed on July 18, 2003.

(3) STATUS OF CLAIMS

Claims 3, 6, 8-11 and 15-17 have been cancelled by the amendment of November 18, 2002.

Claims 1, 2, 4, 5, 7, 12-14, and 18-24 remain rejected by a non-final rejection in an Office action of October 9, 2003 and are forthwith appealed to the Board of Patent Appeals and Interferences.

In the most recent Office action, dated October 9, 2003, an objection was made to the drawings as they relate to claim 4 (see Office action, paper 14, page 2). This objection will be addressed upon conclusion of the instant appeal.

A clean copy of the claims presented for appeal is attached as the Appendix.

(4) STATUS OF AMENDMENTS

No amendments have been filed subsequent to the rejection of October 9, 2003.

(5) SUMMARY OF INVENTION

The present invention, as described in claim 1, is directed to a sealing system for a rotating machine (8) having a stationary element and a drive element (10) rotationally

connected to the stationary element (16) (see Fig. 1 and page 3, lines 12-22). The sealing system includes a plate (24, 34) having a bearing surface (30, 40). The plate (24, 34) is rigidly connected to either the drive element (10) or the stationary element (16) (see page 4, lines 1-4, 10-12). The sealing system also includes a sealing assembly (17) having a resilient bellows (18) and a bearing surface (28, 38) (see page 3, lines 22-26). The bellows (18) provides a force (48), forcing the bearing surface (28, 38) of the sealing assembly (17) against the bearing surface (30, 40) of the plate (24, 34) to form a dynamic seal (32, 42) (see page 5, lines 3-10). The resilient bellows (18) comprises a plurality of corrugations and an inwardly tapered collar (50, 52) to which the thrust plate (20, 22) is secured (see Fig. 2 and page 5, lines 5-8, 18-21).

According to a further aspect of the invention, the sealing assembly (17) includes a thrust plate (20, 22) secured to the collar (50, 52) of the resilient bellows (18), where said thrust plate (20, 22) provides the bearing surface (28, 38) of the sealing assembly (17). Further, claim 4 describes the sealing assembly (17) as having a static sealing element disposed within a gap (54, 56) provided between the collar (50, 52) and the thrust plate (20, 22) (see page 5, lines 21-28).

According to yet another aspect of the invention, claim 24 defines a method for forming a resilient bellows (18) for the aforementioned sealing system, in which a bellows (18) is formed with a corrugated hollow body, and an end of the body is folded inwardly to form a collar (50, 52) for receiving a plate (20, 22) (see page 5, lines 11-21).

(6) ISSUES

(A) Whether claims 1, 2, 4, 5, 12-14, and 18-24 are patentable under 35 U.S.C. 103(a) over U.S. Patent No. 3,560,004 to Donley et al. (hereinafter Donley), in view of U.S. Patent No. 2,464,136 to Jenkins (hereinafter Jenkins). Specifically, whether a teaching of the use of a corrugated bellows sealing component in the Jenkins patent renders it obvious to modify a sealing assembly comprising spring members and tapered annular support members in the Donley patent to incorporate the use of a corrugated bellows with tapered collar, as recited in the present invention. Additionally, with regard to claim 4, whether teaching the use of a rubber ring disposed between the end of a bellows and the packing ring in the Jenkins patent renders it obvious to modify the welded sealing assembly of the Donley patent to include a gap between the sealing assembly and the thrust plate in which a static sealing element is disposed.

(B) Whether claim 7 is patentable under 35 U.S.C. 103(a) over Donley in view of Jenkins, and in further view of U.S. Patent No. 3,601,413 to Darnell (hereinafter Darnell). Specifically, whether a teaching of the use of a corrugated bellows sealing component in Jenkins patent renders it obvious to modify a sealing assembly comprising a tapered annular support member in Donley to incorporate the use of a corrugated bellows with tapered collar, as in the present invention.

(7) GROUPING OF CLAIMS

For the purposes of this appeal, the claims have been divided into three groups:

Group I consists of claims 1, 2, 5, 7, 12-14, and 18-23;

Group II consists of claim 4; and

Group III consists of claim 24.

(8) ARGUMENT

The rejections under appeal in the present case are each made under 35 U.S.C. § 103(a). When combining or modifying references under § 103(a), an Examiner must establish a *prima facie* case of obviousness or the rejection will be overturned. See *In re Rinehart*, 189 USPQ 143 (CCPA 1976); *In re Linter*, 173 USPQ 560 (CCPA 1972); *In re Saunders*, 170 USPQ 213 (CCPA 1971); *In re Tiffin*, 170 USPQ 88 (CCPA 1971), *amended*, 171 USPQ 294 (CCPA 1971); *In re Warner*, 154 USPQ 173 (CCPA 1967), *cert. denied*, 389 U.S. 1057 (1968). The seminal case of *Graham v. John Deere Co.*, 383 U.S. 1, illuminates three steps or factual inquiries that an Examiner must engage in to establish such a *prima facie* case of obviousness. According to *Graham*, the examiner must: (1) set forth each of the differences between the claim and the reference(s) sought to be combined or modified; (2) set forth the proposed modification; and (3) explain why the proposed modification is obvious. 383 U.S. at 17. The case of *In re Jones* further explained that the third step in *Graham* amounts to a showing of some suggestion or motivation in the prior art that would lead one of ordinary skill in the art to pursue the proposed modification. 21 USPQ.2d 1941, 1943 (Fed. Cir. 1992); see also *In re Vaeck*, 20 USPQ.2d 1438 (Fed. Cir. 1991). In the case of *In re Fritch*, the Court established that the prior art must have suggested the desirability of the modification. 23 USPQ.2d 1780 (Fed. Cir. 1992). It has also recently become apparent that the required suggestion or motivation in the prior art must be clear and particular. *In re Dembiscak*, 175 F.3d 994, 999 (Fed. Cir. 1999).

Having set forth the appropriate standard for establishing obviousness, the specific rejections are discussed hereinafter.

GROUP I: Claims 1, 2, 5, 7, 12-14, and 18-23

Claim 1: The Examiner's references fail to suggest modifying Donley to use a bellows having a plurality of corrugations.

The Examiner has rejected claim 1 under 35 U.S.C. § 103(a) over the Donley patent in view of the Jenkins patent. Appellant submits that, in view of 35 U.S.C. § 103(a) and pertinent case law, the Examiner has not established a *prima facie* case of obviousness in rejecting these claims. Specifically, the Examiner has not presented any persuasive evidence that the prior art suggests the desirability of a modification of the Donley assembly to include the type of bellows component described in the Appellant's specification and disclosed in the Jenkins patent. The Examiner cites language explaining why a bellows with a plurality of corrugations is desirable within the Jenkins design, as described in the Jenkins patent, but he has failed to produce any evidence supporting a motivation to include such a bellows component in the Donley design.

In the most recent Office action (paper no. 14, page 4), the Examiner argues that Jenkins teaches that a bellows having a single corrugation is interchangeable with a bellows having a plurality of corrugations, because the use of a bellows with a single corrugation is depicted in Figure 2 of the Jenkins patent, and the use of a bellows with a plurality of corrugations is shown in Figure 3 of the Jenkins patent, and because the Jenkins patent indicates that the bellows may possess as many corrugations as the operating conditions require. However, both of these bellows shown in Jenkins differ from the sealing assembly of Donley. The Examiner has presented no evidence from the prior art that suggests the desirability of replacing the type of sealing mechanism in the Donley patent (a welded assembly comprising spring members and tapered annular support members) with a bellows having a plurality of corrugations.]

Further, if the seal component depicted in Figure 2 of the Jenkins patent is a bellows with a single corrugation, as asserted by the Examiner, then it must follow that the Donley welded seal assembly (see Donley patent, Figure 1), which exhibits fewer convolutions than the Jenkins bellows with a single corrugation, is either a non-corrugated bellows (having fewer convolutions than the bellows with a single corrugation) or is not a bellows at all. By either interpretation, the ability or suggestion to vary the number of corrugations in the bellows as described in the Jenkins patent relates only to modifying a bellows seal. This in no way suggests substituting the corrugated bellows for a seal that is not already a corrugated bellows, as in Donley.

The Examiner misleadingly cites language from the Jenkins patent in an argument in support of modification of the Donley seal assembly, citing that “the effectiveness of the seal depends upon proper fit and relating the parts so as to utilize the pressure to which the seal is exposed” and that “the corrugations may provide sufficient resiliency to ensure a proper seal contact between the bearing surfaces” (Office action, paper 14, page 4). The “proper fit” referred to in the Jenkins patent describes the seal between the end of the bellows and the mating rubber ring (see Jenkins, column 2, line 55 through column 3, line 6). Thus, Jenkins explains how the use of a corrugated bellows improves this particular type of seal. Since this type of seal (a bellows mating against rubber rings) is not described in the Donley patent, the cited passages of Jenkins provide no motivation to incorporate its corrugated bellows into the Donley design.

Further, the “sufficient resiliency” referred to in the Jenkins patent (column 3, line 65 through column 4, line 2) speaks to the use of a resilient bellows made of stainless steel (see Jenkins, Figure 3) to eliminate the need for helical springs (37) used in a version of the Jenkins design having a non-resilient bellows (Figure 2), to maintain a seal between the

packing ring (21) and mating ring (17) (see column 3, line 65 to column 4, line 2). There is no indication that the resiliency of the Donley seal is insufficient to provide a proper seal between its sealing rings (35, 36), and the Donley patent does not describe a need for additional springs to provide such a seal. Therefore, this statement from Jenkins does not provide any motivation to modify the Donley design to utilize the resilient bellows having a plurality of corrugations described in Jenkins.

For all of the reasons set forth above, the Examiner has failed to show the required motivation or suggestion in the prior art sufficient to establish a *prima facie* case of obviousness.

Claim 1: The Examiner's references teach away from combining the inventions disclosed in the Donley and Jenkins patents.

In addition to the failure to establish the obviousness of modifying the mechanical seal in the Donley patent to use the bellows from the Jenkins patent, the Examiner fails to present any suggestion arising from the prior art to adopt the bellows described in the Jenkins patent with a modified tapered end collar that extends inwardly from an end of the bellows, as described in claim 1. Furthermore, the Jenkins patent teaches away from such a tapered collar. The Jenkins patent describes as an object of the invention that the ends of the bellows be "fixed ... by means of elastic members, such as rubber rings" (column 1, lines 25-29). The Jenkins patent further asserts that "the effectiveness of the seal depends upon proper fit" between the bellows and mating rubber seal rings (column 2, line 75 – column 3, line 6). By emphasizing the indispensability of an elastic seal, the Jenkins patent effectively teaches away from a modification of the bellows ends to provide the inward taper described in claim 1. Also, since the Donley patent discloses a tapered condition on the annular support member component, as relied upon in the Examiner's finding of obviousness, the conflicting

bellows end geometry described in the Jenkins patent further suggests that a combination of the two designs is nonobvious. Since it is improper to combine references where the references teach away from their combination, *In re Grasselli*, 218 USPQ 769, 779 (Fed. Cir. 1983), the rejection relying upon such a combination must be found to be improper.

Additionally, the Jenkins bellows seal is “intended to operate under conditions in which the pressure external of the bellows is greater than the internal pressure” (Column 3, Lines 7-10) and this external hydraulic pressure “maintains sealing contact between the elastic members and the bellows and packing and carrier rings, respectively” (Column 1, Lines 30-37). The Jenkins patent further indicates that the mean diameter factor of the bellows folds is “utilized in conjunction with the well known action of a partially enclosed mass of rubber when exposed to a pressure to accomplish the desired result. The Donley design includes a passage for a heat transfer fluid in which the fluid contacts the internal surface of the sealing assembly, and no fluid pressurizes the external surfaces of the sealing assembly. Since this design does not rely on external pressure to assist in sealing at any location on the sealing mechanism, it would not be obvious to modify the sealing mechanism to use features of a bellows seal that requires external pressure to achieve a seal and uses corrugations designed to best utilize this external pressure. One of ordinary skill in the relevant art seeking to modify the internally pressurized seal of Donley would look to the prior art relating to internally pressurized seals, not to the seal of Jenkins, which requires positive external pressure to properly seal.

Further, the mere fact that the Appellant’s bellows design described in claim 1 could be derived by combining the corrugated bellows component in the Jenkins patent with the inward taper of the annular support members of patent Donley will not by itself support a *prima facie* case of obviousness. As indicated in *In re Mills*, 16 USPQ.2d 1430 (Fed. Cir.

1990), the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In the present case, the desirability of the bellows collar modification is found only in the Appellant's own disclosure; therefore, the Examiner's case for *prima facie* obviousness must fail.

For the above reasons, the Examiner's rejection of claims 1, 2, 4, 5, 7, 12-14, and 18-24 is improper, because the prior art of record does not teach or suggest the use of a bellows sealing component having a plurality of corrugations and an inwardly tapered collar, as required by each of the claims.

GROUP II: Claim 4

Claim 4: The Examiner's references do not teach the inclusion of a gap between the bellows collar and the thrust plate of the Donley design.

Appellant considers claim 4 to be patentable over the prior art for the above reasons, as well as for reasons stated below. Therefore, claim 4 is considered to be patentable separately from claim 1.

In claim 4, it is required that a gap be provided between the collar and the thrust plate in which a static sealing element is disposed. In contrast, the tapered condition of the inner side walls of the annular support members of the Donley patent provides surfaces that "ride upon" (Donley patent, column 3, lines 20-22), or are flush with, the sealing rings with which the annular support members contact, providing no gap between the contacting components. Therefore, the internal walls of the annular support members of the Donley patent do not teach or suggest the provision of a gap between the bellows collar and the thrust plate, as described in claim 4. The Examiner has argued that the rubber ring used in the Jenkins

design may be considered a static sealing element disposed in a gap between the bellows collar and the packing ring or carrier ring (Office action, paper 14, page 5). However, even if such an interpretation were to be adopted, the Examiner has failed to produce any motivation in any of the prior art to modify the Donley sealing mechanism to utilize such a seal.

Further, as discussed above, the Jenkins rubber ring seal relies on external pressure to assist in producing a seal between the bellows and the rubber ring. Since the Donley design was intended for use with system fluid internal to the sealing mechanism and no external pressurization, the prior art teaches away from incorporating this component of the Jenkins patent. Similar to the rejection of the group 1 claims, the Examiner has failed to produce a motivation or suggestion from the prior art that would render obvious the inclusion of the aforementioned gap and static seal in the Donley design.

For these reasons, claim 4 is patentable independently of any patentability in claim 1. Further, regarding claim 4, it is submitted that the Examiner has not established a *prima facie* case of obviousness as required by *Graham*, and thus the rejection is improper.

GROUP III: Claim 24

Claim 24: The prior art does not teach a method for forming a corrugated bellows with inwardly folded end collar.

Claim 24 has been rejected for identical grounds to that of claim 1, as set forth in Issue A, involving the Donley and Jenkins patents. Appellant considers claim 24 to be patentable over the prior art for the reasons explained under Group I, as well as for reasons stated below. Therefore, claim 24 is considered to be patentable separately from claim 1.

With regard to claim 24, the Examiner insists that the prior art references (the Donley patent and the Jenkins patent) when combined teach a method for forming a resilient bellows sealing component by (1) forming a bellows having a corrugated hollow body, and (2)

folding an end of the body inwardly to form a collar for receiving a plate (Office Action, paper no. 11, page 7). Appellant contends that the claimed method is not taught or suggested by the prior art, as neither patent discusses a method of forming a corrugated bellows component with a tapered end collar as required by claim 24.

The Donley patent provides for the use of a sealing assembly comprising two annular support members and two spring members. The Donley patent indicates that these components "overlapped and are resistant welded to each other" to form the mechanical seal (Donley patent, Column 3, line 17). This clearly does not disclose a method of forming a bellows having a corrugated body, as admitted by the Examiner (see Office action 14, page 10). Further, while a taper is depicted on the annular support members in the Donley patent, which make up the ends of the welded mechanical seal, nowhere in the Donley patent is the manner of forming this taper disclosed.

Although the Jenkins patent discloses the use of a corrugated bellows sealing component, the patent does not disclose a method of forming said bellows. Further, as discussed above with regard to Group I, the Jenkins patent does not disclose or suggest a bellows having an inwardly tapered collar. Therefore, the step of folding an end of the body inwardly to form a collar for receiving a plate could not be disclosed or suggested by the Jenkins patent.

As with the Group I claims, the Examiner presented no suggestion or motivation to combine the Donley and Jenkins patents in an effort to produce a method of forming a bellows having both corrugations and a tapered collar. In fact, as explained above, the manner with which the Jenkins bellows seals against the mating rubber ring seal and the need for external hydraulic pressure to effect the seal in Jenkins effectively teaches away from such a combination of the Donley and Jenkins designs. Thus, the suggestion or motivation

required for a *prima facie* case of obviousness has not been met, and the Examiner's rejection must fail. Additionally, even if the references were combined as proposed by the Examiner, all of the limitations of the claim would not be taught or suggested, since neither the Donley patent nor the Jenkins patent disclose or suggest either a method of forming a corrugated bellows or a method of folding the end of a bellows component inward to form a collar.

In the most recent Office action, the Examiner attempts to overcome some of the above shortcomings of the rejection by redefining claim 24 as a product-by-process claim (see Office action, paper 14, pages 13-14). The Examiner has either misunderstood the plain language of claim 24, which recites "a method for forming a resilient bellows" and not the bellows structure itself, or he has misapplied the law of product-by-process claims to reject a method claim, for which patentability is clearly not based on the product itself, contrary to the Examiner's contention.

For these reasons, claim 24 is patentable independently of any patentability in claim 1. Further, regarding claim 24, it is submitted that the Examiner has not established a *prima facie* case of obviousness as required by *Graham*, and thus the rejection is improper.

CONCLUSION

With regard to each of Examiner's rejections under 35 U.S.C. §103(a), a *prima facie* case of obviousness has not been made. In essence, the Examiner has rejected each of Appellants' claims on the grounds that it would be obvious to combine the sealing assembly of the Donley patent, which utilizes welded annular springs and support members sealing against thrust plates, with the corrugated bellows used in the Jenkins patent. These rejections are flawed for two reasons. First, the Examiner provides no support for the conclusion that this combination was obvious at the time the instant invention was made. More specifically,

the Examiner presents no evidence from the prior art referenced (the Donley and Jenkins patents) that would lead one of ordinary skill in the art to pursue the proposed modification. Second, since a primary object of the Jenkins patent is to provide a bellows seal in which the ends are fixed by means of elastic members and the seal is assisted by the external pressure of the hydraulic system fluid, it would not be obvious to combine the sealing mechanism in the Jenkins patent with the sealing assembly described in the Donley patent, where the tapered support members “ride upon” the mating thrust plates and the sealing mechanism seals against an internal system fluid without the aid of external hydraulic pressure. As discussed above, the mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 16 USPQ.2d 1430 (Fed. Cir. 1990). The Examiner repeatedly asserts that the proposed modifications were obvious at the time of the invention; however, no valid support for that conclusion, in the form of a suggestion or motivation in the prior art, is provided.

None of the cited references teach or suggest either the use of a corrugated bellows having an inwardly tapered end collar or the method for forming such a bellows. The Donley patent does not teach or suggest the use of a bellows having a plurality of corrugations, as recited in Appellant’s claims. Further, it has been shown that the Jenkins patent effectively teaches away from inclusion of a tapered collar at the end of the bellows, as it relies on the use of elastic rubber ring sealing members and external hydraulic pressure to provide a seal.

There must be a showing in the prior art sought to be combined or modified that would provide motivation to one of ordinary skill in the art to make the proposed modification at the time of the invention. That showing must be “clear and particular” and



the prior art must suggest the "desirability" of making such a combination. The Examiner has failed to make any such showing.

For the aforesaid reasons, it is respectfully submitted that the Examiner has not established a *prima facie* case of obviousness in making each of the appealed rejections. Therefore, it is hereby requested that each of Examiner's rejections be reversed.

Respectfully submitted,

PEARNE & GORDON LLP

By: 

Aaron A. Fishman, Reg. No. 44682

1801 East 9th Street
Suite 1200
Cleveland, Ohio 44114-3108
(216) 579-1700

Date: January 9, 2004

(9) APPENDIX

- 1 1. A sealing system for a rotating machine having a stationary element and a drive
- 2 element rotationally connected to said stationary element, the sealing system comprising:
- 3 a plate comprising a bearing surface, the plate for connecting to one of said drive
- 4 element and said stationary element; and
- 5 a sealing assembly comprising a resilient bellows and a bearing surface, the bellows
- 6 having a plurality of corrugations and a tapered collar extending inwardly from an end of the
- 7 bellows, and the bellows providing a force which causes the bearing surface of the sealing
- 8 assembly to bear on the bearing surface of the plate to form a dynamic seal.

- 1 2. The sealing system of claim 1, wherein the sealing assembly further comprises a
- 2 thrust plate attached to the collar, and wherein the thrust plate provides said bearing surface
- 3 of the sealing assembly.

- 1 4. The sealing system of claim 2, wherein the sealing assembly further comprises a
- 2 static sealing element, the static sealing element being disposed within a gap provided
- 3 between the collar and the thrust plate.

- 1 5. The sealing system of claim 1, further comprising a mounting element for
- 2 connecting said plate to said one of said drive and stationary elements.

- 1 7. The sealing system of claim 1, wherein said plate comprises graphite which
- 2 provides a sealing and lubricating layer to the dynamic seal.

1 12. The sealing system of claim 1, further comprising a seal chamber which at least
2 partially encloses said sealing assembly.

1 13. The sealing system of claim 12, wherein the seal chamber is defined by the
2 stationary element.

1 14. The sealing system of claim 12, further comprising a seal gland which closes an
2 area of the seal chamber.

1 18. A resilient bellows for a sealing system in a rotating machine having a stationary
2 element and a drive element rotationally connected to said stationary element, the resilient
3 bellows comprising:
4 a hollow body;
5 a plurality of corrugations in the body; and
6 a tapered collar extended inwardly from an end of the body for receiving a plate.

1 19. The resilient bellows of claim 18, wherein the tapered collar comprises an
2 inwardly turned edge of the body.

1 20. The resilient bellows of claim 18, wherein the tapered collar has a frustoconical
2 shape.

1 21. The resilient bellows of claim 18, further comprising a sealing structure disposed
2 at the tapered collar for statically sealing the plate to the bellows.

1 22. The resilient bellows of claim 21, wherein the sealing structure comprises a
2 gasket.

1 23. The resilient bellows of claim 21, wherein the sealing structure comprises a
2 sealant.

1 24. A method for forming a resilient bellows for a sealing system in a rotating
2 machine having a stationary element and a drive element rotationally connected to said
3 stationary element, the method comprising steps of:
4 forming a bellows having a corrugated hollow body; and
5 folding an end of the body inwardly to form a collar for receiving a plate.